WE CLAIM:

1. An optoelectronic subassembly for interconnecting a plurality of optical communications fibers supported in an optical ferrule to an optoelectronic device having a plurality of photoactive components, said optoelectronic subassembly comprising:

a silicon substrate carrier adapted to support the optoelectronic device and including an alignment structure for cooperating with the optical ferrule to align the optical fibers with the photoactive components of the optoelectronic device when the subassembly is connected to the optical ferrule and one or more alignment marks placed on said carrier and precisely aligned relative to the alignment structure so that when the optoelectronic device is positioned with reference to the alignment marks the photoactive components will be precisely aligned with the optical fibers upon interconnection of the subassembly with the optical ferrule.

2. The optoelectronic subassembly according to claim 1, wherein:

said alignment structure is etched into said silicon substrate carrier using photolithography techniques.

3. The optoelectronic subassembly according to claim 1, wherein:

said silicon substrate carrier includes conductive traces for providing signals to the optoelectronic device.

4. The optoelectronic subassembly according to claim 1, wherein:

said carrier includes a transparent film layer deposited onto the surface of said carrier using photolithography techniques.

5. The optoelectronic subassembly according to claim 4, wherein:

said transparent film layer comprises silicon dioxide.

6. The optoelectronic subassembly according to claim 4, wherein:

said alignment marks comprise material deposited on the surface of said transparent film layer using photolithography techniques.

7. The optoelectronic subassembly according to claim 6, wherein:

said alignment marks comprise metal traces.

8. The optoelectronic subassembly according to claim 4, further including:

a set of metal traces deposited as a grid on said transparent layer using photolithography techniques which are operative for suppressing EMI emissions.

9. The optoelectronic subassembly according to claim 4, wherein:

said silicon substrate carrier includes a window section etched into said carrier, and

said optoelectronic device is mounted on said carrier over said window section.

10. The optoelectronic subassembly according to claim 9, wherein:

said silicon substrate carrier includes conductive traces for providing signals to the optoelectronic device.

11. The optoelectronic subassembly according to claim 1, wherein:

said alignment structure includes a plurality of alignment apertures extending through said carrier and a plurality of guide pins received in said alignment apertures for cooperating with the ferrule to align the optoelectronic device with the fibers in the optical ferrule.

12. The optoelectronic subassembly according to claim 11, further including:

a support block defining a plurality of support passages formed to receive said plurality of guide pins therein so that said substrate and guide pins are aligned and rigidly supported for interconnection with the optical ferrule.

13. The optoelectronic subassembly according to claim 11, wherein:

said silicon substrate carrier includes conductive traces for providing signals to the optoelectronic device.

14. The optoelectronic subassembly according to claim 11, wherein:

said alignment apertures are etched into said silicon substrate carrier using photolithography techniques.

15. A fiber optic communications module, comprising:

a set of optical fibers supported in an optical ferrule having a ferrule alignment structure;

a carrier including:

a) a carrier alignment structure adapted for cooperating with the alignment structure of said ferrule and aligning said carrier with said ferrule,

b) a window section,

c) a transparent film layer disposed on the surface of the carrier over said window section, and

d) an alignment mark placed on said film layer and precisely aligned relative to the carrier alignment structure for positioning an optoelectronic device; and

an optoelectronic device having a set of photoactive components corresponding to said set of optical fibers in said ferrule which is mounted on

said film layer of said carrier with reference to said alignment mark over said window section so as to be precisely aligned with said carrier alignment structure so that said photoactive components are aligned for optical communication through said window section with said optical fibers when said carrier is coupled to said ferrule.

16. The fiber optic communications module according to claim 15, wherein: said photoactive components comprise vertical cavity surface-emitting lasers.

17. The fiber optic communications module according to claim 15, wherein: said photoactive components comprise PIN photodiodes.

18. The fiber optic communications module according to claim 15, wherein: said carrier comprises a silicon substrate.

19. The fiber optic communications module according to claim 18, wherein: said silicon substrate carrier includes metal traces for conducting signals and providing power to said optoelectronic device.

20. The fiber optic communications module according to claim 18, wherein: said transparent layer is composed of a dielectric material deposited on said silicon substrate using photolithography techniques.

21. The fiber optic communications module according to claim 18, wherein: said alignment mark comprises one or more metal traces deposited on said transparent layer using photolithography techniques.

22. The fiber optic communications module according to claim 18, further

including:

a set of metal traces deposited using photolithography techniques as a grid on said transparent layer over said window section for use in suppressing EMI emissions.

23. The fiber optic communications module according to claim 18, wherein:

said photoactive components are arranged in a first linear array,

said optical fibers are arranged in a second linear array corresponding to said first array of photoactive components,

and said module further includes a set of lenses disposed in a lens array for collecting and focusing light passing between said fibers and photoactive components.

24. A fiber optic communications module, comprising:

a set of optical fibers supported in an optical ferrule having a set of alignment holes;

a silicon substrate carrier including a set of alignment apertures which are etched into said substrate using photolithography techniques and is adapted for cooperating with the alignment structure of said ferrule and aligning said carrier with said ferrule;

a set of guide pins adapted for mating with said alignment holes and alignment apertures; and

an optoelectronic device having a set of photoactive components corresponding to said set of optical fibers in said ferrule which is mounted on so as to be precisely aligned with said carrier alignment apertures so that said photoactive components are aligned for optical communication through said window section with said optical fibers when said guide pins are mated with said alignment holes and alignment apertures and said carrier is coupled to said ferrule.

25. The fiber optic communications module according to claim 24, wherein:

said photoactive optical components are arranged in a first linear array, and

said optical fibers are arranged in a second linear array corresponding to said first array of photoactive components.

26. The fiber optic communications module according to claim 24, further including:

an alignment structure for said optoelectronic device deposited on said carrier using photolithography techniques.

27. The fiber optic communications module according to claim 26, wherein:

said alignment structure comprises one or more metal traces.

28. The fiber optic communications module according to claim 15, wherein:

said photoactive components comprise PIN photodiodes.

29. The fiber optic communications module according to claim 24, further including:

a support block including one or more support passages formed therein to receive the guide pins for securely supporting said guide pins and said carrier in precisely aligned positions.

30. The fiber optic communications module according to claim 24, wherein:

a transparent film layer deposited on the surface of said carrier using photolithography techniques.

31. The fiber optic communications module according to claim 30, wherein:

said film layer comprising one or more of silicon dioxide, silicon nitride or polysilicon or polyimide.

32. A optoelectronic transceiver subassembly for connecting a set of photoactive components with a set of optical fibers supported in an optical ferrule having one or more alignment holes, said transceiver subassembly comprising:

a silicon substrate carrier including one or more alignment apertures extending through the carrier fabricated on said silicon substrate carrier using photolithography techniques;

an optoelectronic device comprising said set of photoactive components which is precisely mounted on said carrier with reference to said alignment apertures;

a support block attached to said carrier and including support passages for securely supporting said guide pins in alignment with said carrier; and

one or more guide pins mounted so as to extend through said apertures and mate with said one or more alignment holes in said ferrule for aligning said carrier with said ferrule and said photoactive components with said optical fibers.

33. The transceiver subassembly of claim 32, wherein:

said silicon substrate carrier also includes one or more alignment marks for use in mounting said optoelectronic device.

34. The transceiver assembly of claim 33, wherein:

said silicon substrate carrier also includes a transparent film layer on which said alignment marks are deposited and a window section over which said optoelectronic device is mounted.

35. The transceiver assembly of claim 34, further including:

a set of metal traces deposited as a grid on said transparent film layer for use in suppressing EMI emissions.

36. An optoelectronic module for use in a fiber optic communications, comprising:

a fiber optics ferrule supporting a set of optical fibers and having a ferrule alignment structure;

a silicon substrate carrier adapted to support said optoelectronic device, said carrier including:

a) a plurality of electrically conductive traces for carrying signals to devices mounted on said carrier,

b) a carrier alignment structure for cooperating with said ferrule alignment structure and aligning said carrier with said ferrule, and

c) one or more alignment marks constructed on said carrier and precisely aligned relative to said carrier alignment structure for use in precisely positioning and mounting devices on said carrier; and

an optoelectronic device comprising a set of photoactive components which is mounted on a carrier with reference to one or more of said alignment marks so that said fibers are aligned with said photoactive components when said carrier is aligned with said ferrule.

37. The optoelectronic module of claim 36, in which:

said ferrule alignment structure comprises a set of alignment holes and said carrier alignment structure comprises a set of alignment apertures in said carrier and guide pins extending through said apertures.

38. The optoelectronic module of claim 37, further including:

a support block having one or more support passages formed therein to receive the guide pins for securely supporting said guide pins and said carrier in precisely aligned positions.

39. The optoelectronic module of claim 36, in which:

said carrier further includes a window section extending through said carrier, a transparent layer disposed over said window section and one or more alignment marks for precisely positioning devices on said carrier.

40. The optoelectronic module of claim 36, in which:

said photoactive components are arranged in a first linear array, and

said optical fibers are arranged in a second linear array corresponding to said first array of photoactive components

41. The optoelectronic module of claim 38, wherein:

said guide pins cemented into said alignment passages of said support block.

42. The optoelectronic module of claim 39, further including:

a set of metal traces deposited as a grid on said transparent film layer for use in suppressing EMI emissions.

43. The optoelectronic module of claim 38, wherein:

said photoactive components comprise vertical cavity surface-emitting semiconductor lasers.

44. An optoelectronic subassembly module adapted for interconnecting with a fiber optics ferrule supporting a set of optical fibers and having a ferrule alignment structure, said module comprising:

an optoelectronic device including a set of photoactive optoelectronic components;

a silicon substrate carrier adapted for supporting said optoelectronic device and providing electrical signals thereto, said carrier including a carrier alignment structure for cooperating with said ferrule alignment structure for accurately aligning said fibers with said photoactive components and including one or more alignment marks constructed on said carrier for use in accurately positioning and mounting said optoelectronic device on said carrier with respect to said carrier alignment structure.

45. The optoelectronic subassembly module of claim 44, in which:

said carrier includes a window section etched into said carrier using photolithography techniques for enabling optical signals to pass between said optoelectronic device and said optical ferrule through said window section in said carrier.

46. The optoelectronic subassembly module of claim 44, in which said carrier further includes:

a transparent film layer deposited on said silicon substrate carrier over said window portion on which said alignment marks are deposited.

47. The optoelectronic subassembly module of claim 46, in which:

said alignment marks comprise metal traces deposited on said transparent layer using photolithography techniques.

48. The optoelectronic module of claim 44, in which:

said carrier alignment structure includes one or more alignment apertures and one or more guide pins engaged in said alignment apertures.

49. The optoelectronic module of claim 48, further including:

a support block having alignment passages for receiving the ends of said guide pins of said carrier alignment structure and securely supporting said guide pins and said carrier in an aligned position.

50. The optoelectronic module of claim 46, further including:

a set of metal traces deposited as a grid on said transparent film layer using photolithography techniques for use in suppressing EMI.